LI.—*A Contribution to the Systematics of Scorpions.* By R. I. Pocock.

I.—Some Corrections in Nomenclature.

The genus *Ischnurus* was first published in 1837 in 'Uebersicht des Arachnidensyst.,' pt. 1, p. 37, and based upon the species described as *I. complanatus*, the only species cited under it. *I. complanatus*, therefore, is the type of *Ischnurus*; and since *complanatus* is congeneric with the type species of *Hormurus*, that genus falls as a synonym of *Ischnurus*.

In his monograph on Scorpions (Das Tierr., Scorpiones, p. 153, 1899) Kraepelin falls into the error of dating *Ischnurus* from 1838, when Koch described under it three species—namely, *I. ochropus*, *I. australasiæ*, and *I. complanatus*; and since Thorell had eliminated the last two under *Hormurus*, Kraepelin assigned the remaining species *ochropus* to *Ischnurus*. This method of dealing was based upon the mistake in the date of publication of *Ischnurus*. The latter must take *complanatus* and *australasiæ*, leaving *ochropus* available for the name *Chiromachus*, which I proposed for it in 1893 (Ann. & Mag. Nat. Hist. (6) xii. p. 320).

These conclusions may be briefly tabulated as follows:—

1. *Ischnurus*, C. L. Koch, Uebers. Arachnidensyst. i. p. 37, pl. vi. fig. 69 (1837) (type *complanatus*).

   Syn. *Sisyphus*, id. ib. on pl. vi. fig. 69 (errore for *Ischnurus*).
   Ischnurus (in part only), C. L. Koch, 1838.
   Hormurus, Thorell, Ann. & Mag. Nat. Hist. (4) xvii. p. 14 (1876) (type *H. caudicula*, L. Koch).
   Not syn. *Ischnurus*, Thorell, Karsch, Pocock, and Kraepelin.

2. *Chiromachus*, Pocock, Ann. & Mag. Nat. Hist. (6) xii. p. 320 (1893) (type *ochropus*, C. Koch).

   Syn. *Ischnurus*, C. Koch, Die Arachn. iv. p. 69 (1838) (in part.); Kraep. Jahrb. Hamb. Wiss. Anst. xi. p. 130 (1894); id. Das Tierr., Scorp. &c. p. 153 (1899).
   Not syn. *Ischnurus*, C. Koch, 1837.

The name *Centrurus*, which, since 1876, has been applied by common consent to a well-known American genus of Buthidæ, was originally projected into literature in 1828 by Hemprich and Ehrenberg as a *nomen nudum*, no species being cited as referable to it (Symb. Phys., Scorpiones, 1828; Verh. nat. Fr. Berlin, 1829, p. 350; Férussac, Bull. Sci. Nat. xviii. p. 304, 1829). It is true that Ehrenberg appears to have

labelled certain specimens in the Berlin Museum with the name *Centrurus*; but this action does not establish its right to recognition. The first author to introduce the name in the orthodox and accepted fashion into systematic zoology was C. Koch, who, in 1838 (Die Arachn. iv. p. 110), assigned it to a scorpion described as *Centrurus galbineus*, which was alleged by Karsch to be based upon the young of a species belonging to a genus inhabiting the Oriental Region and afterwards named *Palamnæus* by Thorell. Gervais rightly accepted Koch's application of the name *Centrurus*. Peters, on the contrary, finding Ehrenberg's labelled specimens, used *Centrurus* for the species exemplified by them, discarding *Isometrus* as a synonym, in spite of its far greater claims for admittance. If C. Koch had not previously taken up the name *Centrurus*, Peters's application of it might have been accepted, and strong reasons could have been advanced for following Thorell when, in 1876, he used *Centrurus* in a restricted sense for the genus diagnosed by himself and typified by *Scorpio gracilis* of Latr. (=*biaculeatus*, Luc.). But since the name had no recognized status until Koch introduced it, I see no escape from the conclusion that it must date from 1838 and be regarded as assignable to the genus typified by the species described by Koch as *Centrurus galbineus*.

For the genus *Centrurus*, as diagnosed by Thorell, I adopt the name *Centruroides*, which, although without a diagnosis, was given by Marx to one of the species, namely *C. exilicauda*, Wood. This species, therefore, is the type of the genus in question. It has not been described since 1863, and its generic position was unknown to Kraepelin when preparing his monograph of the scorpions in the 'Tierreich,' in spite of Marx's publication on the subject.

Its characters and synonymy are given below (see p. 376).

II.—Notes on some Species of *Parabuthus* contained in the British Museum.

1. *Parabuthus planicauda*, Poc. (Ann. & Mag. Nat. Hist. (6) iii. p. 344, pl. xv. fig. 5, 1889).—The type of *P. planicauda*, Poc. (*i. e.* the female specimen measured and described in the original description), is specifically identical with the South-African form to which Purcell has recently restricted the name *capensis* of Hemor. & Ehrenb. The evidence that these two names are synonyms, however, is very far from conclusive. In fact, all the data upon which I can lay hands point rather to the opinion that Purcell has redescribed

capensis as *neglectus*. The facts that lead me to this view are briefly these :—

(1) It is, perhaps, more likely than not that the types of *capensis* in the Berlin Museum came from German rather than from British territory in South Africa. *P. neglectus* inhabits German S.W. Africa, *P. planicauda* does not.

(2) Ehrenberg described at the same time as he described *capensis* a species named *granulatus*, which is known to occur in German S.W. Africa, where it exists alongside of *P. neglectus*. The idea that the types of the two were collected together at once suggests itself.

(3) In Keyserling's collection in the British Museum there are a couple of specimens (♂ ♀) ticketed "Cap b. espér." and labelled "*Prionurus capensis*, Ehrb.," which, from certain internal evidence, I have reasons to believe were identified by Dr. Karsch, who had access to Ehrenberg's types for comparison. These specimens are referable to *P. neglectus*, not to *P. planicauda*.

(4) Kraepelin describes the male of *P. capensis* as having wide hands. This is true of *P. neglectus*, not of *P. planicauda*. Kraepelin also had access to Ehrenberg's type.

In view of these considerations it would be a mistake to cite *planicauda* as a synonym of *capensis* until the stronger claims of *neglectus* for such a fate have been further entertained.

The British Museum has specimens of this species from Port Elizabeth (*H. A. Spencer, I. L. Drège, J. M. Leslie*), Grahamstown (*Schönland*), Tea Fountain, near Grahamstown, and Jansenville (*Miss Leppan*).

P. capensis, subsp. *Frenchi*, Purc.

The British Museum has specimens of this subspecies from Burghersdorp (*Miss Leppan*).

2. *Parabuthus neglectus*, Purcell (= *P. planicauda*, Poc., in part. Male specimen, ticketed "W. Africa," of original description).

The Museum is badly off for this species, possessing only the two males ticketed "W. Africa" that were originally referred to *planicauda*, the male and female mentioned above as belonging to Keyserling's collection, one ticketed "Cape of Good Hope" ('*Challenger*'), and one from Garies in Namaqualand (*Dr. R. Broom*).

3. *Parabuthus granulatus,* Hempr. & Ehrenb.

The British Museum has specimens from Benguela (*Monteiro*), Port Nolloth and Garies (*Dr. R. Broom*), Pearston (*Dr. Broom*), Jansenville (*Miss Leppan*), Hopefield, Graaf Reinet.

P. granulatus, subsp. *fuscus,* Poc.

Kalahari Desert (*R. Cunningham*).

The British East-African species *P. pallidus,* Poc., of which the Museum possesses examples from Mombasa, Giriama, and Taru, differs entirely from *P. granulatus* in the completion of the median lateral keel on the fourth caudal segment, the small hands of the male, the enlarged basal pectinal lobe in the female, &c.

4. *Parabuthus flavidus,* Poc. (Ann. & Mag. Nat. Hist. (7) iii. p, 419, 1899).

According to Purcell's table of the South-African species of *Parabuthus, P. flavidus* falls alongside *P. Schlechteri* from Bechuanaland, which is unknown to me; but the two seem to be at least separable as follows:—

a. Upper surface of second caudal segment with a moderately large oval shagreened excavation occupying its anterior half, the posterior half mesially grooved and smooth; shagreen fine, not squamiform; pectinal teeth in male from 46–51 ..... *Schlechteri.*

b. Upper surface of second caudal segment evenly channelled throughout, the entire channel covered with coarse, mostly squamiform shagreen; pectinal teeth 36–37 in male ..... *flavidus.*

The type and hitherto only recorded individual of this species is a subadult example from Taungs in Bechuanaland (*H. A. Spencer*). A much larger specimen collected by Mr. R. Cunningham in the Kalahari Desert gives the following measurements in millimetres:—

Total length 77; carapace 8·5; tail 48; width of first segment 6, of fourth 7; width of brachium 3, of hand 4·2; length of movable finger 7.

5. *Parabuthus cristatus,* Poc. (Ann. & Mag. Nat. Hist. (7) vii. p. 284, 1901), from the Congo, differs from *P. brevimanus* as described by Purcell in having the sides and lower surface of caudal segments 1–3 smooth, and not "densely and finely granular." Moreover, the four inferior keels of

the first are strong and smooth, not "granular" and "rather weak." The shagreened area of the first and second segments is not flanked by an oblique row of granules, giving them a broadly cuneate appearance. It is noticeable, moreover, that Purcell makes no mention of the strong lobate inferior crest running along the fore margin of the lower side of the fourth caudal segment and abutting against and as high as the U-shaped crest on the third—a feature which has no parallel in other species of the genus. Yet, since Purcell states that the description of *P. cristatus* mentions no structural character to distinguish that species from *brevimanus*, I can only conclude that the characteristic in question is present in *brevimanus*. If so, it is not a little singular that neither Thorell (who "minutely describes both sexes of *brevimanus*"), Purcell (who devotes nearly three pages to the species, mentioning all the less important details), nor Kraepelin say a word to justify the belief in its existence.

III.—Descriptions of some New and Old Species.

Family Scorpionidæ.

Genus Pandinus, Thorell.

Pandinus Percivali, sp. n.

♀.—*Colour* a tolerably uniform yellowish brown, the terga anteriorly darker, fingers darker; a brown spot at the distal extremity of the femur, patella, and protarsus of the leg.

Carapace densely and closely punctured; the interocular triangle and the area at the sides of and behind the median eyes smooth; some coarse punctures on the frontal lobes, and a few granules in front of the ocular tubercle; studded at the sides with coarse but not close-set granules; about as long as the first and the second and one third of the third caudal segments, and a little longer than the third and fourth segments.

Terga smooth, polished and punctured, except at the sides and along the posterior border, where, except in the middle line, there are many coarse granules; the last with the lateral crests weak, granular, the area between the admedian pair quite smooth.

Sterna quite smooth, punctulate, the last obsoletely crested.

Tail about three times as long as carapace, slender; fourth segment about twice as long as wide, third considerably less than that, fifth almost three times as long as wide; the superior and superior lateral keels denticulated; the inferior

and inferior laterals smooth, except on the fourth, where they are weakly denticulated or crenate, and on the fifth, where they are distinctly denticulated; intercarinal spaces smooth; vesicle much wider than high, as wide as the third caudal segment, serially granular below and laterally.

Chelæ: humerus with superior and anterior denticulate crests, a few scattered coarse granules on the upperside; the lower side with a series, sometimes partially double, of coarse granules along the posterior border; lower side of brachium with three rows of setal pores posteriorly, the anterior crest of the lower side denticulate, the posterior smooth, the anterior surface minutely granular, with one large denticle, the posterior surface pitted with coarse punctures, but smooth; the superior crest crenate; hand very wide, its width equal to the median length of the carapace and a little shorter than the movable finger, its upperside punctulated, smooth, with a sculpturing of low smooth anastomosing ridges, nearly obsolete in the middle, but becoming coarser and more tubercular towards the inner edge and externally above the smooth keel of the underhand; inner edge of hand widely rounded, not much produced posteriorly, and strongly dentate in the middle, the denticles becoming smaller towards the base of the immovable finger and posteriorly, the whole of the posterior border of the lobe smooth; underside of the hand with a few scattered denticles and a pair of weakly denticulated keels; no large tooth on the fingers.

Legs with two external protarsal spines on the first and second, one apical on the third, and none on the fourth; tarsal lobes armed with four spines, one of which is apical, the total number of spines on the tarsi being five in front and seven or eight behind, the larger number being upon the third and fourth legs.

Pectinal teeth 21–22.

Measurements in millimetres.—Total length 98; carapace 17; tail 53; width of hand 15, length of underhand 9·8, of movable finger 16.

Loc. Al-khaur, in the Abian country, 80 miles east of Aden, in Arabia. Collected by Mr. A. B. Percival.

Apparently most nearly resembling the Somaliland species *P. meidensis* of Karsch in the sculpturing and crests on the upperside of the hand and the presence of only a small number of granules on the posterior underside of the humerus; but in *meidensis* there are four rows of setal pores on the underside of the brachium and two more spines, one on each side, upon the tarsi of the legs. The other Arabian species, *P. arabicus* of Kraepelin (Jahrb. Hamb. Wiss. Anst.

xi. p. 58, 1894 ; id. Das Tierr., Scorpiones &c. p. 120, 1899), described from Homran, differs from *P. Percivali* in the thick and coarse granulation of the underside of the humerus of the chela and in having only three instead of four spines on the tarsal lobes, only two keels on the upperside of the hand, &c.

Genus Urodacus, Peters.

Urodacus spinatus, sp. n.

♂.—Allied to *U. hoplurus*, Poc. (Ann. & Mag. Nat. Hist. (7) ii. p. 64, 1898), from Lawlers, Western Australia, but differing in the following features :—

The frontal portion of the *carapace* is smooth, polished, and finely punctured, not tubercular ; its median area bearing the eyes is not elevated. The two granular crests on each side of the last abdominal *tergite* extend well past the middle of the plate, the external reaching further than the internal ; in *U. hoplurus* the external barely reaches the middle, the internal falls far short of it.

Tail longer and thinner than in *U. hoplurus*, almost six times as long as the carapace, which is as long as its first segment + ¼ of the second or as the fourth ; first segment about twice as long as wide, the fourth four times as long as wide ; superior keels of segments 1–4 weakly denticulated and terminating in a high, erect, triangular spike like that of *U. hoplurus* ; inferior keels of the fourth distinctly but weakly denticulated ; in *U. hoplurus* these keels are smooth ; vesicle weakly and sparsely granular, as wide as the second caudal segment, wider than the fifth, its height about equal to the width of the fourth.

Chelæ much flatter than in *U. hoplurus*, the upperside of the brachium defined behind by a keel ; the keel on the hand stronger than in *U. hoplurus*, the height of the outer surface of the hand equal to about half its length along the keel of the underhand ; inferior pores on brachium and hand as in *U. hoplurus* ; movable finger about as long as carapace.

Five posterior protarsal spines on first *leg*, six on second and third legs ; in *U. hoplurus* there are five of these spines on the first and second legs and four on the third leg.

Pectinal teeth 20–21.

Measurements in millimetres.—Total length 93 ; carapace 10 ; tail 68 ; length of first segment of tail 7·5, length of fifth segment 15 ; width of vesicle 3·5 ; height of hand 5 ; length of underhand 8 ; width of hand 6·3.

Loc. Queensland · Cape York Promontory.

Urodacus subarmatus, sp. n.

♀.—*Colour* a tolerably uniform yellowish brown.

Carapace as long as the caudal segments 1+2 or 3+4, rather longer than the fifth; anteocular area smooth except for some weak tubercles behind the anterior margin, the margin obliquely truncate, with a shallow median notch; the ridges of the ocular tubercle continued in front halfway across the anteocular area, and continuous behind with the ridges bounding the posterior triangular impression.

Terga very finely granular at the sides; the internal granular keels of the last extending to the middle of the plate, the external surpassing the middle; last sternal plate with two conspicuous smooth keels.

Tail short, about four times as long as the carapace, moderately robust, first segment about as wide as long, the fifth a little more than twice as long as wide, wider than the fourth and almost as wide as the second; superior keels of segments 1–4 ending behind in a triangular spike, the anterior border, however, of which is in the same straight line as the granular superior crest; supero-lateral crest also sharply granular; inferior crests smooth, those of the fourth at most weakly granular; fifth segment with denticulated keels, its lower surface somewhat thickly granular between the keels, the median of which consists of two rows of granuliform denticulations; sides and, to a lesser extent, the upper surface of the segment granular; vesicle thickly but finely granular, as wide as the fifth caudal segment.

Chelæ with humerus weakly granular above; brachium smooth, except the crests that border its anterior surface above and below, the lower surface bordered behind by a smooth crest, in front of which there is a row of eleven pores; hand smooth all over, except for a few granules on its upper inner edge, thick, convex above, and furnished with two fairly strong finger-keels, and a row of about eleven pores beneath on the inner side of the keel of the underhand, and about twelve irregularly arranged above it; movable finger furnished throughout three fourths of its length with three closely packed rows of squamiform teeth, and in the distal fourth with a single median row, flanked on the inner side with about four short transverse rows of three teeth each and on the outer side with about four pairs of transversely set teeth.

Protarsus of first and second *legs* with six (rarely five) long, slender, subequal spines, that of the third with five, that of the fourth with four.

Pectinal teeth 17.

Measurements in millimetres.—Total length 62; carapace 9; tail 36, length of its first segment 4, of its fifth 8·6; width of hand 6·5, height 4·8; length of underhand 7·5, of finger 9·5.

Loc. Queensland: Cape York Promontory.

In many respects the type of this species resembles that of *U. armatus*, Poc., which was from Port Lincoln in South Australia. If the two had come from the same locality, I should have been inclined to regard them as sexes of one and the same species, in spite of the fact that the superior lateral keels of the first four caudal segments are smooth or nearly so in *U. armatus* and sharply granular in *U. subarmatus*. This structural character, coupled with the difference in distribution, completely justifies the view of the specific distinctness of the two forms.

Kraepelin's statements (Das Tierr., Scorpiones, p. 103, 1899), that *U. armatus* and *U. hoplurus* are characterized by the presence of a single row of teeth extending nearly throughout the length of the movable finger of the chela, that the last abdominal sternum is without conspicuous keels, and that the underside of the brachium is also keelless, have no foundation in fact.

Urodacus simplex, sp. n.

♂.—*Colour* a uniform yellowish brown.

Carapace with squarely truncate anterior border and deep median angular notch, with a small triangular sclerite in the middle; anteocular area smooth, very finely punctured, with a few granules in front; lateral portions of carapace shagreened; ocular ridges not continuous behind with the ridges bordering the posterior impression.

Terga finely and closely granular, smoother in the middle; the last with only a small number of larger granules marking the lateral keels, which are so prominent in most other species.

Tail about four times as long as the carapace, which is a little shorter than segments 1+2 or 3+4 and only a little longer than 5; sides of segments lightly convex; segments 1–4 smooth except for a few lateral granules; inferior keels smooth, superior and superior lateral keels granular or subdenticulated, the former a little elevated posteriorly; fifth segment with granular intercarinal spaces; the inferior median keel double.

Chelæ with brachium distinctly though finely granular

above, smooth externally, with ten or eleven inferior setal pores; upperside of hand flat, with inner finger-keel nearly obsolete, the height of its outer side almost half its length; a row of fifteen or sixteen pores on its underside; fingers armed with a single median row of teeth and a single series of spaced teeth on each side of it, short, the movable considerably shorter than the carapace.

Legs with six protarsal spines on the first, five on the second and third.

Pectinal teeth 16.

Measurements in millimetres.—Total length 46; length of carapace 6·3, of tail 27, of first + second caudal segment 7·5, of the fifth 6·5; width of hand 4·6, height 3·2; length of underhand 5·5, of movable finger 5·5.

Loc. Queensland: Cape York Promontory.

Distinguishable from all the species known to me by the simple dentition of digits of the chelæ &c.

Family Buthidæ.

Genus Buthus, Leach.

Buthus mauritanicus, sp. n.

Colour blackish brown all over, like *B. bicolor* and *æneas*, with hand redder and tarsi pale; a pale stripe on the first, second, and third sterna.

Allied to *B. crassicauda*, Olivier, from Persia and Asiatic Turkey, but with the carapace and terga more coarsely granular and with more coarsely granular keels; the keels on the last abdominal sternum and lower side of first caudal segment smoother.

Tail keeled and with its intercarinal spaces smooth, as in *B. crassicauda*, but relatively thicker; third and fourth segments the widest of the series, the fourth as wide as long, inferior lateral keel of fifth with one large lobate tooth in front of the trilobate terminal lobe, from which it is separated by a space containing from one to three smaller teeth. In *B. crassicauda* there are about three subequal large teeth and often no distinct interval between them and the terminal lobe.

Chelæ with the hand incrassate in both sexes, that of the male large, much wider than the brachium, the movable digit only lightly sinuate, the immovable with a deep basal notch and large lobate prominence.

Pectinal teeth about 28 in both sexes.

Measurements in millimetres.—♂. Total length 69; length

of carapace 8, of tail 42, width of its third segment 7, length 6·5; width of brachium 3, of hand 4; length of movable finger 9.

Loc. Morocco (adult males and females collected by Mr. F. G. Aflalo and received from the Zoological Society of London); Tangiers (*F. W. Frohawk*); Mehedija, at the mouth of the Sebu River (*E. G. B. Meade-Waldo*).

The largest example of this species I have seen is a male, measuring 75 millim., taken by Mr. Meade-Waldo.

This scorpion has probably been confounded hitherto with one or the other of the black species of *Buthus* which occur on the shores of the Mediterranean, and which have been until lately confounded as one species under the name *crassicauda*. In Journ. Linn. Soc., Zool. xxv. p. 308, I pointed out that the Egyptian black scorpion, *B. bicolor*, is quite distinct from the Persian and Syrian form, *B. crassicauda*. This opinion was adopted by Kraepelin in Das Tierr., Scorpiones, p. 17 (1899). But under the synonymy of *bicolor* appears the name *æneas*, which was given by C. Koch to an Algerian species. The British Museum, however, possesses black scorpions from Algeria and Tunisia which must be referred to *æneas*, and these I find to be specifically distinct from the Egyptian *B. bicolor*. The references and synonyms of *B. æneas* are as follows:—

Androctonus æneas, C. Koch, Die Arachn. vi. p. 3, fig. 432 (1839) (♀); id. in Wagner's Reisen in Algier, iii. p. 218, Atl. pl. x. (1841) (♀).
Androctonus bicolor, Lucas, Expl. de l'Algérie, Zool. i. p. 271, Atl. pl. xviii. (1849) (♂).

Both *B. bicolor* and *B. æneas* differ from *B. crassicauda* and *B. mauritanicus* in having the middle of the upperside of the last abdominal tergum and of the first caudal segment and to a lesser extent of the second finely and closely granular, the granular area perhaps constituting a stridulating-organ such as is found in the genus *Parabuthus* (see P. Z. S. 1892, p. 222). The Egyptian form, *B. bicolor*, may be distinguished from the Algerian *B. æneas* by having the median lateral keel strong and almost complete anteriorly upon the second and third caudal segments, and the hand in both male and female not wider than the brachium and of equal width in both sexes; whereas in *B. æneas*, to judge from the small number of specimens in the British Museum from Tunis and Algeria that I refer to this species, the hand of the adult male is longer as compared with the movable finger and thicker than the brachium, and the median lateral keel is weaker on the second caudal segment and almost absent on the third.

There is still, however, much to learn regarding the black forms of *Buthus* allied to *B. australis* and *B. bicolor*, and it may ultimately prove that *B. crassicauda* and *B. mauritanicus* are melanistic subspecies of the former.

Thorell (Bull. Soc. Ent. Ital. xxv. p. 357, 1894) has already recorded from Tunis two examples, referred to *B. australis*, which differ from the typical form only in being entirely olive-green in colour.

Genus Centruroides, Marx.

Centruroides Hasethi, sp. n.

Syn. *Centrurus granosus*+*Bertholdi*, Thor., Kraepelin, Das Tierr., Scorpiones et Pedipalpi, p. 90 (1899) (nec *Centrurus granosus*, Thor.; nec *C. Bertholdi*, Thor.).

In the 'Biologia Centrali-Americana,' Arachn. Scorp. pp. 27–28, I have pointed out that the male of the scorpion from Curaçoa identified by Kraepelin as *C. Bertholdi*, Thorell, which was considered to be the male of *C. granosus*, Thor., differs from *C. Bertholdi* in having no subaculear tooth upon the vesicle, the carapace longer than the first caudal segment, than half the length of the sum of the first and second, and more than one seventh the length of the tail, and in the smoothness of the upper keels of the hand; and on p. 32 I have given reasons for regarding *C. granosus* of Thorell as based upon a small specimen of *C. margaritatus*, and have pointed out that the female of the species from Curaçoa which Kraepelin referred to *C. granosus* differs from that species in colour and in having no subaculear tooth upon the vesicle.

The type (♂) of this new species and a female, both received in exchange from Dr. Kraepelin of the Hamburg Museum, were collected in the island of Curaçoa.

Their measurements in millimetres are as follows:—

♂. Total length 66; length of carapace 6; of tail 44, of its first segment 5·5, second segment 6·5, fifth segment 8; width of brachium 2, of hand 3; length of underhand 4·7, of movable finger 7.

♀. Total length 71; carapace 7; tail 43, its first segment 5, second segment 6·3, fifth 8·3.

For the sake of comparison I subjoin some of the measurements of *C. Bertholdi*, as given by Thorell:—Total length 79·5; carapace 6·5; tail 51·5, its first segment 7, second 8·5, fifth 10·3.

These dimensions speak for themselves when compared with those of the male of *C. Hasethi*.

Centruroides exilicauda (Wood).

Buthus exilicauda, Wood, Proc. Ac. Philad. 1863, p. 107; id. Journ. Ac. Philad. v. p. 366 (1863).
Centrurus exilicauda, Marx, P. Ent. Soc. Wash. p. 91 (1888).
Centruroides exilicauda, id. Proc. U.S. Mus. 1889, p. 211.

♀.—Of about the same size and coloration as *C. subgranosus*, Kr., being uniformly ochraceous with exception of the eyes, which are black; no distinct dorsal black bands, merely an indication of a slightly paler median and lateral spot on the terga; a faintly defined dark band on lower side of tail.

Upperside of *trunk* and surfaces of *tail* noticeably more coarsely and closely granular than in *C. subgranosus*; the last abdominal sternum closely granular throughout, the four keels distinctly granular and closer to each other than in that species, the fourth with traces of a pair of keels; also short lateral keels present on the terga.

Tail longer and much thinner than in *C. subgranosus*, about six times as long as carapace, as long as the third segment of the tail, the latter twice as long as wide, fifth segment about three times as long as wide; vesicle smooth, more globular, not granular, and with no subaculear tooth, only the minutest trace discernible. (In *C. subgranosus* the third caudal segment is distinctly less than twice as long as wide and the fifth is only twice and a half as long as wide; the vesicle is granular.)

Chelæ and *legs* more granular than in *C. subgranosus*, all the crests on the hand stronger and more distinctly granular, that of the underhand granular. Movable finger with stronger lobe. Coxæ of legs finely granular, especially along their anterior edges.

Pectinal teeth 19.

Measurements in millimetres.—Total length 48; carapace 4·5; tail 29, length of fifth segment 5·2, width 1·7,

Loc. Lower California: San José del Cabo (in Mus. Brit.).

The above-described specimen appears to belong to the species from Lower California named *Buthus exilicauda* by Wood, which was referred by Marx to the genus *Centrurus*, and was subsequently made by this author the type of the uncharacterized genus *Centruroides* and recorded from St. Margaret's Island. According to Wood, the species attains a length of 45 millim. (20–21 lines), has 18 pectinal teeth, very small hands, and no subaculear tooth. The colour is said to be "dilute aurantiaco-brunneus, interdum obscure maculatus," with generally an inferior stripe on the tail,

apparently such as is seen in the Texan examples of *C. vittatus* in the British Museum.

The species also resembles the preceding, *C. Hasethi*, Pocock, from Curaçoa, in the absence of the subaculear tooth, but differs in having the crests on the hands studded with pearly granulation, the smaller number of pectinal teeth, the smooth and more globular vesicle, &c.

Genus Rhopalurus, Thor.

Rhopalurus Borellii, sp. n.

Heteroctenus agamemnon, Pocock, Journ. Linn. Soc., Zool. xxiv. p. 393 (1893). Nec *Tityus agamemnon*, C. Koch, Die Arachn. vi. p. 103, fig. 506; and Kraepelin, Das Tierr., Scorpiones &c. p. 94 (1899) (*Centrurus*).

♀.—*Colour*. Upperside of trunk a nearly uniform yellowish brown, the frontal area of the carapace infuscate; tail yellow, with exception of the fourth and fifth segments, the latter deep blackish brown throughout, the former blackish posteriorly, more deeply and extensively so beneath and laterally than above; inferior median keels of third segment sometimes infuscate; chelæ with humerus and brachium clear yellow, hands strongly infuscate, but not so dark as the fingers, which are black, with the extreme apex yellow; mandibles distally infuscate; legs and sterna uniformly pale yellow.

Carapace coarsely granular, the granules subserially arranged laterally, as long as the first + ½ the second or as the fifth caudal segment.

Terga coarsely granular, without lateral crests.

Sterna for the most part smooth, but the depressed area on each side of the first finely and closely granular throughout as far back as the stigma, the median triangular area perfectly smooth and sparsely punctured, last sternum granular throughout and with four granular crests.

Tail thick and strong, more than five times as long as the carapace; fourth segment as wide as long, fourth and fifth a little wider than first, the former about one fourth, the latter about one third longer than wide; upperside of tail weakly granular, sides and lower surface thickly and coarsely granular, especially on the posterior segments; the keels coarsely granular, the superior subdenticulate posteriorly, upperside of fourth and fifth segments excavated, with upstanding keels; the median lateral keel strong on the second and quite distinct on the third segment, and just detectable on the fourth; vesicle weakly granular, wider than high, a little

wider than the hand or the brachium; an acute subaculear tooth about twice its basal diameter from the aculeus.

Chelæ very finely granular above, with coarsely and evenly granular crests; hand narrow, as wide as brachium, its width two thirds the length of the underhand, which is less than half that of the movable finger; upper surface of hand shagreened, with feebly granular but conspicuous finger-keels; movable finger longer than fifth caudal segment, weakly lobate, with eight rows of teeth.

Legs weakly granular, with granular crests.

Pectines strongly expanded at base, as in *R. junceus*, with 19–20 teeth.

♂.—*Tail* a little longer than in female, nearly six times as long as carapace, the latter as long as the first + ¼ of the second and slightly shorter than the fifth segment, fourth segment about one fourth longer than wide.

Hand smooth, not crested, much wider than brachium, its width nearly equal to the length of the underhand, which exceeds half the length of the movable finger, the two fingers separated by a narrow ~-shaped space.

Pectinal teeth 24–25.

Measurements in millimetres.— ♀. Total length 75; carapace 8·5; tail 44, width of first segment 5, of fourth 5·5, of brachium 2·5, of hand 2·8; length of underhand 4, of movable finger 10.

♂. Total length 77; carapace 8·5; tail 47, width of first segment 5·5, of fourth 6·5, of brachium 2·5, of hand 4·2; length of underhand 5, of movable finger 9.

Loc. Brazil (in Mus. Brit.).

I formerly supposed the specimens here described to be referable to *Tityus agamemnon* of C. Koch; but according to Kraepelin, who has presumably examined Koch's types, *T. agamemnon* has only eight keels on the second and third caudal segments, as in *junceus*. Also the median area of the first abdominal sternum is said to be granular. The species, which I have pleasure in dedicating to Dr. Borelli, is most nearly related to *R. laticauda*, Thorell.

Genus Tityus, C. Koch.

Tityus Engelkei, sp. n.

Allied to *T. pachyurus* and *T. metuendus*, but differing from both in colour as well as in certain structural characters.

Prevailing *colour* yellowish brown, frontal portion of cara-

pace sometimes blackish anteriorly; terga never longitudinally banded and with scarcely a sign of spots; sterna not variegated; tail with its fourth and fifth segments and vesicle strongly infuscate in the adult, the upperside of the fourth paler; cheliceræ distally infuscate; legs almost uniformly pale, at most obscurely mottled distally; chelæ pale, with black fingers.

Fingers of male widely separated at base.

Pectinal teeth 21–23 in male, generally 21 in female.

Movable *finger* with 16 rows of teeth.

Measurements in millimetres.—♂. Total length 77; carapace 8; centre of tubercle to posterior border of carapace 4·5; tail 50; width of first segment 4·5, third 5·4, fourth 6; vesicle 3; length of second segment 7·5, of fourth 8·7, of fifth 8·5; width of brachium 3·3, of hand 5; length of movable finger 10·5.

♀. Total length 77; carapace 8; tail 43, width of first segment 4·3, of fifth 4·5, of brachium 3, of hand 3·5.

Loc. Onaca, 2200 feet (type), and Chiaca, 1200 feet, in St. Martha in Colombia. Collected by Mr. Charles Engelke.

Tityus Kraepelini, sp. n.

Allied to *T. magnimanus*, Poc., but with the inferior median keels of the third caudal segment not united, merely converging in the posterior third of the segment, those of the fourth confluent in the posterior half of the segment, without, however, forming a definite median longitudinal crest as in *T. magnimanus*, but a series of irregularly disposed granules.

♂.—*Colour* blackish, with the chelæ, excepting the fingers, reddish.

Tail a little longer than that of *T. magnimanus*; chelæ much like those of that species, but the fingers much shorter, the movable only as long as the fourth caudal segment, whereas in *T. magnimanus* it is longer than the fifth (9·5 : 8·6).

♀.—Differing from those of *T. magnimanus* and *trinitatis* by the structure of the inferior keels on the third and fourth caudal segments; further differing from *T. trinitatis* in the greater thickness of its tail (*cf.* measurements).

Measurements in millimetres.—♂ (type). Total length 62; carapace 6·3; tail 40, width of its fourth segment 3·5, length of third segment 7, of fourth 7·5, of brachium 7·5, of underhand 5·5, of movable finger 7·5; width of hand 3·3.

♀. Total length 62; carapace 6·5; tail 37, width of its first segment 3·6, length of the fourth 6·5, width 4, length of

the fifth 7·5, width 4; length of brachium 7, width 3; length of hand 4·5, width 3·5; length of movable finger 8.

Loc. Venezuela: Merida (type) and Pedregosa.

In 1898 I received a dried female specimen of this species, ticketed "Merida," from Prof. Kraepelin. The material was, however, not sufficient to base a species upon. Recently the British Museum has acquired examples of both sexes from that locality, as well as one from Pedregosa, which satisfactorily establish the constancy of the characters.

LII.—*Description of a new Genus and Species of Apterous Locust from Ecuador.* By W. F. Kirby, F.L.S., F.E.S.

Opaon, gen. nov.

Head convex above, with a row of granulations running from the occiput nearly to the inner edge of each eye; eyes separated by a space about equal to their width; fastigium depressed, subtriangular, extending between the antennæ nearly to the length of the scape; lower part of face falling away obliquely behind the level of the eyes; antennæ with thirteen joints of the flagellum remaining, which are not unlike those of a Prionide beetle; joints very thick, two or three times as long as broad; pronotum as long as broad behind, where it is somewhat widened, transversely wrinkled, and with two distinct transverse sutures, the first about the middle, the second halfway between this and the extremity; before the middle are one or two shallow ones; hinder edge with a row of large rounded warts. Mesothorax, metathorax, and first segment of abdomen covered with larger and smaller warts, and with an irregular carina, rising into an obtuse projection behind each; the meso- and metathorax contracted in the middle, so as to leave wide interstices between, the centre of which is blackish; prosternal spine broad at base, conical and rather pointed at tip; abdomen contracted in the middle, and transversely wrinkled behind the first segment; legs rather hairy, first two pairs short, front tibiæ with no foramina, femora and tibiæ of about equal length, nearly straight, tibiæ with some short spines towards the extremity beneath; second joint of tarsi distinctly shorter than the first, third considerably longer than both the others together, smooth, widened towards the